Paper No. 27

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DAVID A. STYCZINSKI

Appeal No. 1998-1517
Application No. 08/685,269[1]

ON BRIEF

Before JERRY SMITH, FLEMING, and LEVY, Administrative Patent Judges.

LEVY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-12[2], which are all of the claims pending in this application.

[1] Continuation of U.S. application Serial No. 08/321,946, filed Oct. 12, 1994; now abandoned.

[2] The amendment (Paper No. 16, filed June 11, 1997) filed subsequent to the final rejection (Paper No. 15, filed April 8, 1997) was denied entry by the examiner (Paper No. 17, filed June 18, 1997).

BACKGROUND

Appellant's invention relates to a redundant array of disk drives with asymmetric mirroring. An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced as follows:

1. A method for processing data in data processing system including a redundant array of independent disk drives (RAID) operatively controlled by an array controller comprising the steps of:

providing a plurality of data drives and a single predefined mirror drive in the RAID; said single predefined mirror drive having a set capacity substantially greater than a capacity of each of said plurality of data drives;

writing data to multiple data drives in the RAID;

writing a mirror copy of said written data to said predefined mirror drive in the RAID; and

reading data from said multiple data drives.

The prior art reference of record relied upon by the examiner in rejecting the appealed claims is:

Jacobson et al. (Jacobson) 5,392,244 Feb. 21, 1995.
(filed Aug. 19, 1993)

Claims 1-12 stand rejected under 35 U.S.C. § 103 as being unpatentable over Jacobson.

Rather than reiterate the conflicting viewpoints advanced by the examiner and appellant regarding the above-noted rejection, we make reference to the examiner's answer (Paper No. 20, mailed October 8, 1997) for the examiner's complete reasoning in support of the rejection, and to appellant's brief (Paper No. 19, filed September 10, 1997) and reply brief (Paper No. 21, filed December 8, 1997) for appellant's arguments thereagainst. Only those arguments actually made by appellant have been considered in this decision. Arguments which appellant could have made but chose not to make in the briefs have not been considered. See 37 CFR 1.192(a).

OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the rejections advanced by the examiner, and the evidence of obviousness relied upon by the examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellant's arguments set forth in the briefs along with the examiner's rationale in support of the rejection and arguments in rebuttal set forth in the examiner's answer.

It is our view, after consideration of the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to one of ordinary skill in the art the invention as set forth in claims 1-12. Accordingly, we reverse, essentially for the reasons set forth by appellant.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir.), cert. denied, 488 U.S. 825 (1988); Ashland Oil, Inc. v. Delta

Resins & Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985), cert. denied, 475 U.S. 1017 (1986); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole. See id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

We consider first the rejection of independent claim 1 under 35 U.S.C. § 103 based on the teachings of Jacobson. The examiner's position (answer, page 5) is that "it would have been obvious to one of ordinary skill in the art to modify Jacobson to consider the Jacobson mirror drives either column

26 or 28 to be a single mirror drive" to make "it simpler for the outside user to visualize the concept of a diverse group of drives," and because (id. at page 8) Jacobson has a virtual storage scheme. The examiner further asserts (id. at page 4) that Jacobson "does not particularly teach that the predefined mirror drive has a set capacity substantially greater than a capacity of each of the plurality of data drives . . .. This modification would have been obvious because such is an obvious design choice which changes size/range [citation omitted] and/or changes proportion."

Appellant asserts, inter alia (brief, page 22; See also reply brief, pages 2 and 3), that

> The cited Jacobson et al. reference provides no suggestion of any means for or step of assigning a plurality of data drives and a single predefined mirror drive in the RAID, nor that the single predefined mirror drive has a set capacity substantially greater than a capacity of each of the plurality of data drives

and that (brief, page 24) the modifications proposed by the examiner is the result of impermissible hindsight.

We find that in Jacobson (col. 3, lines 29-66), Figure 1 shows disks 12 arranged in a mirror group 18 and a parity group 22. Mirror group 18 represents a first memory location

or RAID area of the disk array which stores data according to a first or mirror level redundancy, i.e., a RAID level 1. The mirror redundancy is diagrammatically represented by the three pairs of disks 20 in Figure 1. Original data can be stored on a first set of disks 26, while duplicated, redundant data is stored on the paired second set of disks 28. Disks 24 of parity group 22 represent a second memory location or RAID area in which data is stored in a second redundancy area, such as a RAID level 5. Original data is stored on five disks 30 and redundant parity data is stored on sixth disk 32.

Jacobson further discloses (col. 4, lines 32-40) that

> The disk arrangement of **Fig. 1** is provided for conceptual purposes. In practice, disk array **10** would simply have a plurality of disks **12** which are capable of storing data according to mirror and parity redundancy. Among the available storage space provided by all disks **12**, a portion of that disk space would be allocated for mirror redundancy and another portion would be allocated for parity redundancy. Preferably, disks **12** are configured to contain plural, equal sized storage regions . . ..

In addition, Jacobson discloses (Figure 4 and col. 5, lines 28-34) that physical storage space 34 is referenced by a virtual storage space, and that disks 1-3 have approximately

equal storage capacity with the exception that disk 0 has slightly less storage capacity. Jacobson further discloses (col. 5, lines 8-16) that

> [T]he RAID management system effectively "tunes" the storage resources of a memory system according to the application or user requirements. For instance, in an application requiring high performance and reliability, the RAID management system may create and define a proportionally larger mirror RAID area, thereby dedicating a larger amount of physical storage capacity to mirror redundancy, in comparison to the parity RAID area.

Moreover, in Jacobson (col. 7, lines 44-53), RAID management system 16 selectively adjusts the memory allocation between parity and mirror areas according to the specific performance and reliability requirements of the various applications.

From our review of Jacobson, we find no teaching or suggestion of providing a single predefined mirror drive for a plurality of data drives with the single predefined mirror drive provided with a set capacity substantially greater that the capacity of each of the plurality of data drives, as recited in claim 1.

We do not agree with the examiner (answer, pages 4 and 8) that providing a single predefined mirror drive with a set

capacity substantially larger than a capacity of each of the data drives would have been an obvious design choice of size/range or proportion. We agree that the storage capacity of the drives could be increased in order to increase system capacity as an obvious change in the size of the memory of the drives. However, the claim requires more. Claim 1 requires a single mirror drive for the plurality of data drives, and further requires that the single predetermined mirror drive has a set capacity substantially greater than a capacity of each of the plurality of data drives. This is more than a mere change in size or proportion, but rather is a change in the system configuration, which is not taught or suggested by Jacobson.

While Jacobson does teach that the size of the mirror RAID can be enlarged according to the requirements of the computer application, Jacobson not teach or suggest providing a single predefined mirror drive with a set capacity substantially greater that the capacity of each of the plurality of data drives.

With regard to the examiner's assertion (answer, page 5) that Jacobson "be modified" to consider the Jacobson mirror

drives of column 26 or column 28 to be a single mirror drive, we note at the outset that in Jacobson, column 26 represents data drives, and we find no suggestion to consider them mirror drives. As to the drives in column 28, we note that Jacobson discloses these drives to represent mirror drives, but does not disclose drives 28 to represent a single mirror drive. Jacobson does disclose that in practice, disk array 10 would simply have a plurality of disks 12 with storage space allocated for mirror or parity redundancy (col. 4, lines 32-35). However, Jacobson is silent as to a single predefined mirror drive for a plurality of data drives. The fact that the data will be allocated between mirror and parity redundancy using a virtual storage space does not suggest a single predefined mirror drive for a plurality of data drives.

In sum, we find that the determinations of obviousness advanced by the examiner have not been supported by any evidence that would have led an artisan to arrive at the claimed invention. In our view, the only suggestion for modifying Jacobson in the manner proposed by the examiner to meet the above-noted limitations stems from hindsight

knowledge derived from the appellant's own disclosure. The use of such hindsight knowledge to support an obviousness rejection under 35 U.S.C. § 103 is, of course, impermissible. See, for example, W. L. Gore and Assocs., Inc. v. Garlock, Inc., 721 F.2d 1540, 1553, 220 USPQ 303, 312-13 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). We therefore find that the examiner has failed to establish a prima facie case of obviousness of claim 1. It follows that we cannot sustain the examiner's rejection of claim 1.

As the other independent claims 6 and 11 contain similar limitations (claim 6), or narrower limitations (claim 11 requires a single predefined mirror drive with a predefined capacity greater than or equal to a sum of the capacity of the plurality of data drives), the rejection of claims 1-12 under 35 U.S.C. § 103 is reversed.

REMAND TO THE EXAMINER

On May 30, 2001 an Information Disclosure Statement (IDS) was filed and has been matched with this application at the

Board of Patent Appeals and Interferences. The IDS should be considered by the primary examiner for compliance with 37 CFR §§ 1.197 and 1.198. A communication notifying appellant of the primary examiner's decision should be prepared and mailed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-12 under 35 U.S.C. § 103 is reversed. The application is remanded to the examiner for consideration of the IDS.

REVERSED and REMANDED

JERRY SMITH Administrative Patent Judge	)
MICHAEL R. FLEMING Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)

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APPEAL NO. 1998-1517 - JUDGE LEVY
APPLICATION NO. 08/685,269

APJ LEVY

APJ FLEMING

APJ JERRY SMITH

DECISION: **REVERSED**

Prepared By: GJH

DRAFT TYPED: 21 Jun 02

FINAL TYPED: